

COMSAT GENERAL CORPORATION



August 18, 1986

Dr. Gordon Law
Senior Analyst
Office of Technology Assessment
Congress of The United States
Washington, D.C. 20510

Dear Gordon:

In reference to our meeting and discussions of August 8, I have prepared the attached discussion paper for your use in meeting the communications needs that exist in the Pacific Basin Region.

During the August 8 meeting, you presented information from a study performed for NASA by, I believe, PSSC. The amount of \$600,000.00 represented the annual lease rate for an 25 Khz (narrow-band) channel being charged to the U.S. Government. You may recall that I questioned the origin of this number because at the time it did not seem to me that it was correct. Later, upon reviewing the contract, I learned that the rate of \$600,000.00 per year is based on a five-year commitment for the channel and only if the 500 Khz (wide-band) channel is also leased for the same period. The attached schedule reflects "the most favored customer" pricing terms cited in the contract.

The correct price would be \$1,200,000.00 per year for a three-year commitment. I am sorry that this mixup took place but unfortunately the source of the study did not access the contractual terms and conditions that were negotiated to establish the economy-of-scale prices.

2

I would like to explore the potential use of "C/L" band for your application as a possible backup in the event UHF is not approved. It would not take very long to generate a cost model based on each user's projected requirements. The biggest hurdle, I believe, is the institutional/regulatory issue related to the longterm use of Mobile Maritime frequencies for fixed service applications.

We appreciate the opportunity to be of service and look forward to assisting you in obtaining good communications to serve a very crucial part of the world.

Respectfully,



Don W. Flora
Vice President

DWF/cs

Enc (4)

PACIFIC OCEAN REGION MARISAT/GAPFILLER SATELLITE SYSTEM

OVERVIEW

GAPFILLER UHF communications channels have been in constant use to satisfy government requirements since 1976. These requirements include critical command and control links and emergency/crisis networks that are valid for the foreseeable future.

The GAPFILLER system is an integral component of the government UHF satellite communications capability and is compatible with current and future equipment and subsystems.

The GAPFILLER satellites have provided highly reliable UHF communication services since being placed in orbit in 1976 and the capacity of this system is required through at least the early 1990s.

Military satellite communications assets are controlled by the Joint Chiefs of Staff. The Chief of Naval Operations is designed as Executive Agent for UHF systems. The Commander Naval Space Command is responsible to CNO for operational management of assigned UHF systems including leased GAPFILLER services.

BACKGROUND AND ACQUISITION HISTORY

The COMSAT General Corporation GAPFILLER leased UHF satellite communications service was developed in response to Navy RFP N00039-73-R-0105(Q) dated 10 January 1973. The award for a leased communications service was made on 1 March 1973, contract N00039-73-C-0045, by the Naval Electronic Systems Command, Washington, D.C. (NAVALCYSCOM). COMSAT General Corporation purchased three satellites from the Hughes Aircraft Corporation. Each satellite contains two leased service communication packages: MARISAT, a commercial maritime communications package using a combination of L-band and C-band links and GAPFILLER, a government leased communications package providing military compatible satellite communications at UHF links.

SCHEDULE (OCT 1, 1985)
LEASE OF UHF CAPACITY
(\$MILLIONS PER YR)

<u>CASUAL RATES</u>	<u>1 YR</u>	<u>2 YR</u>	<u>3 YR</u>	<u>4 YR</u>	
WIDE/BAND (WB)	3.4/YR	3.0/YR	2.4/YR	1.8/YR	
NARROW/BAND (NB)	1.6/YR	1.4/YR	1.2/YR	.8/YR	
<u>COMBINATIONS</u>	<u>1 YR</u>	<u>2 YR</u>	<u>3 YR</u>	<u>4 YR</u>	<u>5 YR</u>
W/B + (1) N/B	4.6	4.0/YR	3.2/YR	2.2/YR	1.8/YR
<u>COMBINATIONS</u>					
W/B + (2)* N/B	6.2	5.4/YR	4.4/YR	3.2/YR	2.4/YR

*PACIFIC OCEAN REGION ONLY

TABLE 1MARISAT ORBITAL PARAMETERS
AS OF JULY 1986

	MARISAT 1	MARISAT 2	MARISAT 3
EAST LONGITUDE	344.79	72.45	176.33
DRIFT	-0.010	0.004	0.016
STATION LIM W	344.50	72.40	176.00
(E. LONG) E	345.50	72.60	177.00
ELEMENTS SMA	6.6109495	6.6107941	6.6108818
ECC	0.0001399	0.0002286	0.0001599
INC	6.10141	4.00805	5.49076
RA NODE	74.7814	68.2825	75.2208
MEAN ANOMALY	147.2293	239.6969	340.6079
ARG OF PERIGEE	15.9020	17.6027	13.6137
PERIOD	1436.1445	1436.0940	1436.1226
APOGEE HGT KM	35793.43	35796.18	35793.84
NM	19326.91	19328.39	19327.13
PERIGEE HGT KM	35781.63	35776.90	35780.36
NM	19320.54	19317.98	19319.85
ATTITUDE RA	334.56	313.74	335.62
DEC	84.88	86.01	84.22
OFF SET	1.3956	1.6998	0.9838
FUEL (LBS) SYS 1	34.46	0.00	22.70
SYS 2	34.30	24.77	23.08
FUEL (KG) SYS 1	15.63	0.00	10.30
SYS 2	15.56	11.23	10.47
SAT. WGT. (LBS)	741.735	700.166	719.654
SAT. WGT. (KG)	336.445	317.590	326.429
SAT. IZ	140.678	133.890	136.217
SAT. RPM	91.86	80.68	97.36
EST MNUV. LIFE	END	END	END

MARISAT F-3 (PACIFIC OCEAN REGION) UHF COMMUNICATIONS PERFORMANCE SUMMARY
AND COMPARISONS WITH SPECIFICATIONS

PARAMETER	U.S. NAVY SPECIFICATIONS	CGC SPECIFICATIONS	PRE LAUNCH MEASURED	IN-ORBIT MEASURED
Frequency and Band Center Tolerance (MHz)				
Channel #1	249.100 +0.005	← same	← same	+0.005
Channel #2	254.150 ±0.001	"	"	+0.0022
Channel #3	257.550 ±0.001	"	"	+0.0026
Coverage Area, Transmit (earth station elev. angle)	≥ 5°	≤ 5°	-	≤ 5°
Polarization	RHC	← same	← same	RHC
Satellite Location Latitude Longitude	+ 3° + 1°	← same	-	+ 2.54° + 0.20°
E.I.R.P. (beam edge) dBW				
Channel #1	28.0	← same	29.17	-
Channel #2	23.0	"	23.72	-
Channel #3	23.0	"	24.00	-
E.I.R.P. (beam center) dBW				
Channel #1	-	-	30.47	30.81
Channel #2	-	-	25.22	25.18
Channel #3	-	-	25.30	24.95
Spin Ripple (dB)	≤ +0.5	1.0 pp	-	0.4 pp
Frequency Response (dB/kHz)				
Channel #1	≤ 1.0 +240 ≥ 60.0 down +21000	← same " " "	1.0 +251 60.0 +706.7	1.0 +250 - -
Channel #2	≤ 1.0 +212 ≥ 60.0 down +255	" " " "	1.0 +14.5 60.0 +39.55	1.0 +14.15 - -
Channel #3	≤ 1.0 +212 ≥ 60.0 down +255	" " " "	1.0 14.65 60.0 +42.15	1.0 +14.6 - -
Translation Frequency Stability	≤ +5x10 ⁻⁸ 6 = 60 s	← same	-	+1.77x10 ⁻¹⁰ t = 10 s
Interchannel Intermodula- Products (dB)	C _s /N _O ≤ 8	C/C _s ≥ 40	C _s /N _O = 12	C/C _s = 29
Eclipse Capability (num- ber of operating channels)	3	3	3	-